

CLAIMS

WHAT IS CLAIMED IS:

1 1. (Currently Amended) A method for providing precise control of a magnetic
2 coupling field in a NiMn top spin valve head, comprising:
3 forming ~~at least one~~ a copper seed layer in a NiMn top spin valve;
4 oxidizing the ~~at least one~~ copper seed layer in the NiMn top spin valve; and
5 depositing remaining layers of the NiMn top spin valve head including a NiMn
6 pinning layer having a thickness of less than 200 Å.

1 2. (Currently Amended) The method of claim 1 wherein the ~~at least one~~ copper
2 seed layer is naturally oxidized for 80 seconds under 8×10^{-5} Torr of oxygen pressure.

1 3. (Currently Amended) The method of claim 1 wherein the ~~at least one~~ oxidized
2 copper seed layer reduces the ferromagnetic coupling field without deteriorating GMR effect
3 or resistance.

1 4. (Currently Amended) The method of claim 1 wherein the ~~at least one~~ oxidized
2 copper seed layer provides a negative coupling field without affecting GMR effect or
3 resistance.

1 5. (Currently Amended) The method of claim 1 wherein the ~~at least one~~ oxidized
2 copper seed layer changes the crystalline texture growth of subsequent magnetic layers.

1 6. (Currently Amended) The method of claim 1 wherein the ~~at least one~~ oxidized
2 copper seed layer provides a negative coupling field that is achieved without affecting a
3 GMR effect or resistance of the NiMn top spin valve head.

1 7. (Currently Amended) The method of claim 6 wherein the ~~at least one~~ oxidized
2 copper seed layer provides stronger growth of NiFe(111) and NiMn(111) with respect to
3 NiFe(200) and NiMn(002) phases.

1 8. (Currently Amended) The method of claim 1 wherein the ~~at least one~~ oxidized
2 copper seed layer improves the interfacial roughness.

1 9. (Currently Amended) The method of claim 1 wherein the ~~at least one~~ oxidized
2 copper seed layer prior to deposition of magnetic free layers.

1 10. (Cancelled)

1 11. (Cancelled)

1 12. (Currently Amended) The method of claim 1 wherein the oxidation of the ~~at~~
2 ~~least one~~ copper seed layer provides an approximately 15% increase in amplitude of the
3 output of the NiMn spin valve head at the same coupling field.

1 13. (Currently Amended) The method of claim 12 wherein the oxidation of the ~~at~~
2 ~~least one~~ copper seed layer does not affect asymmetry performance.

1 14. (Cancelled)

1 15. (Cancelled)